

Fig 1

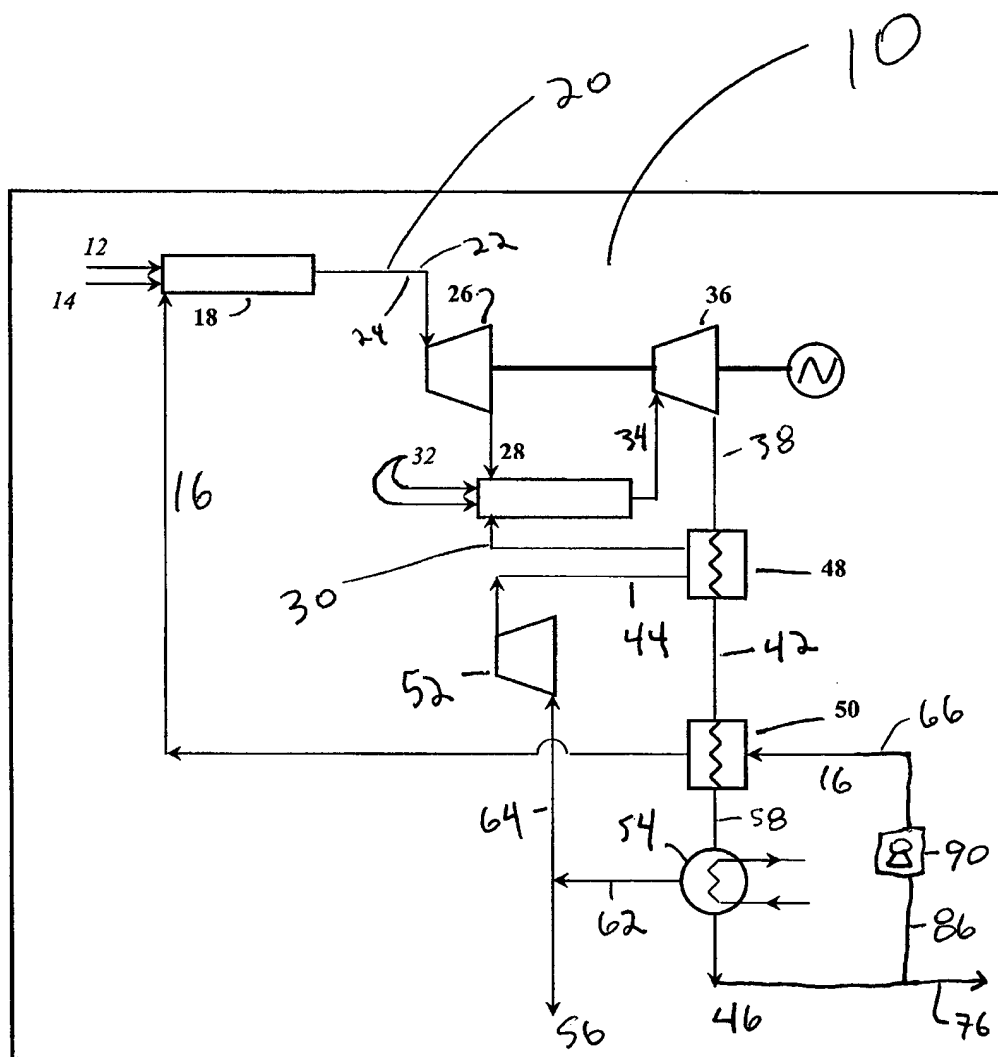
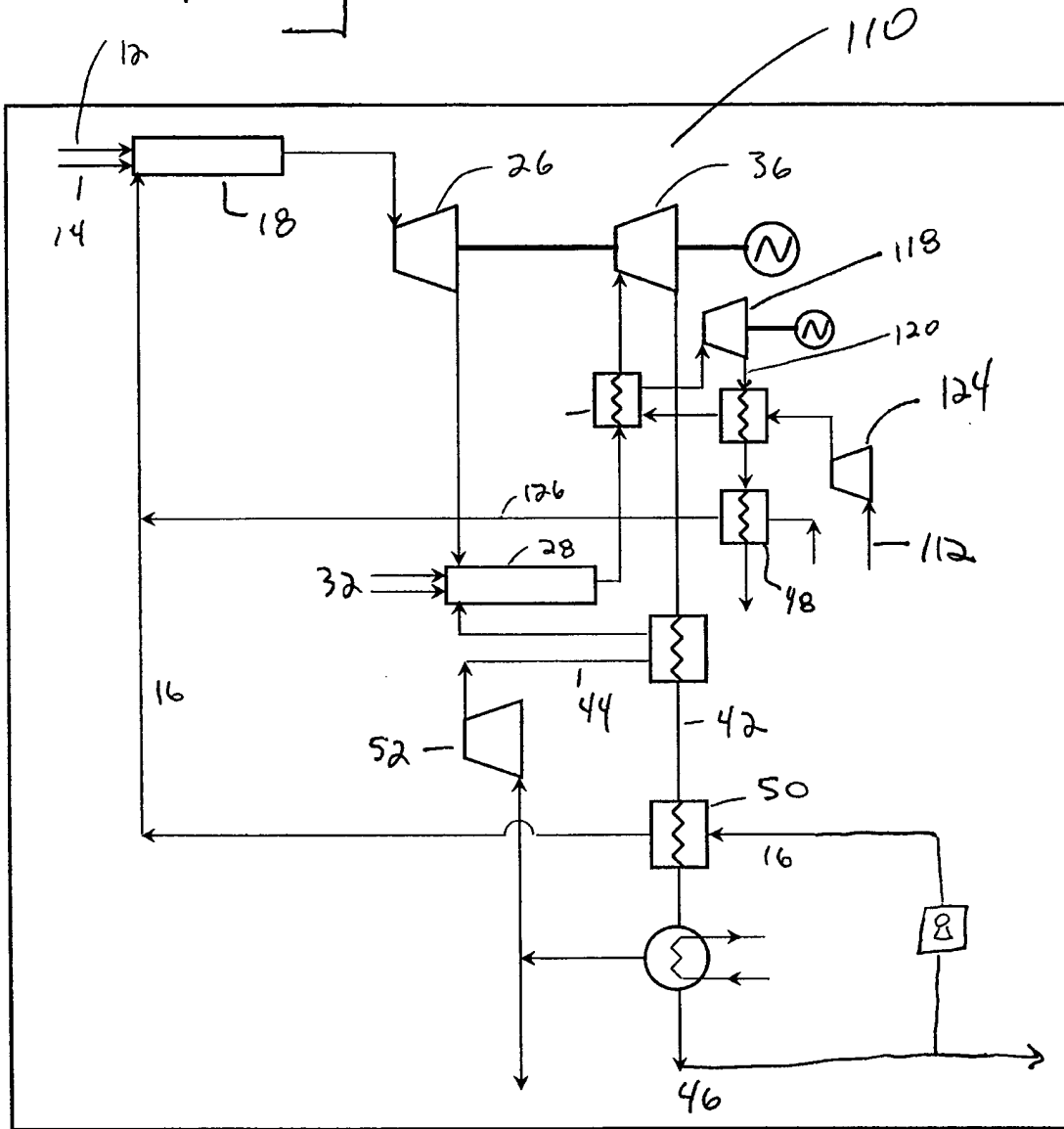


Fig. 2



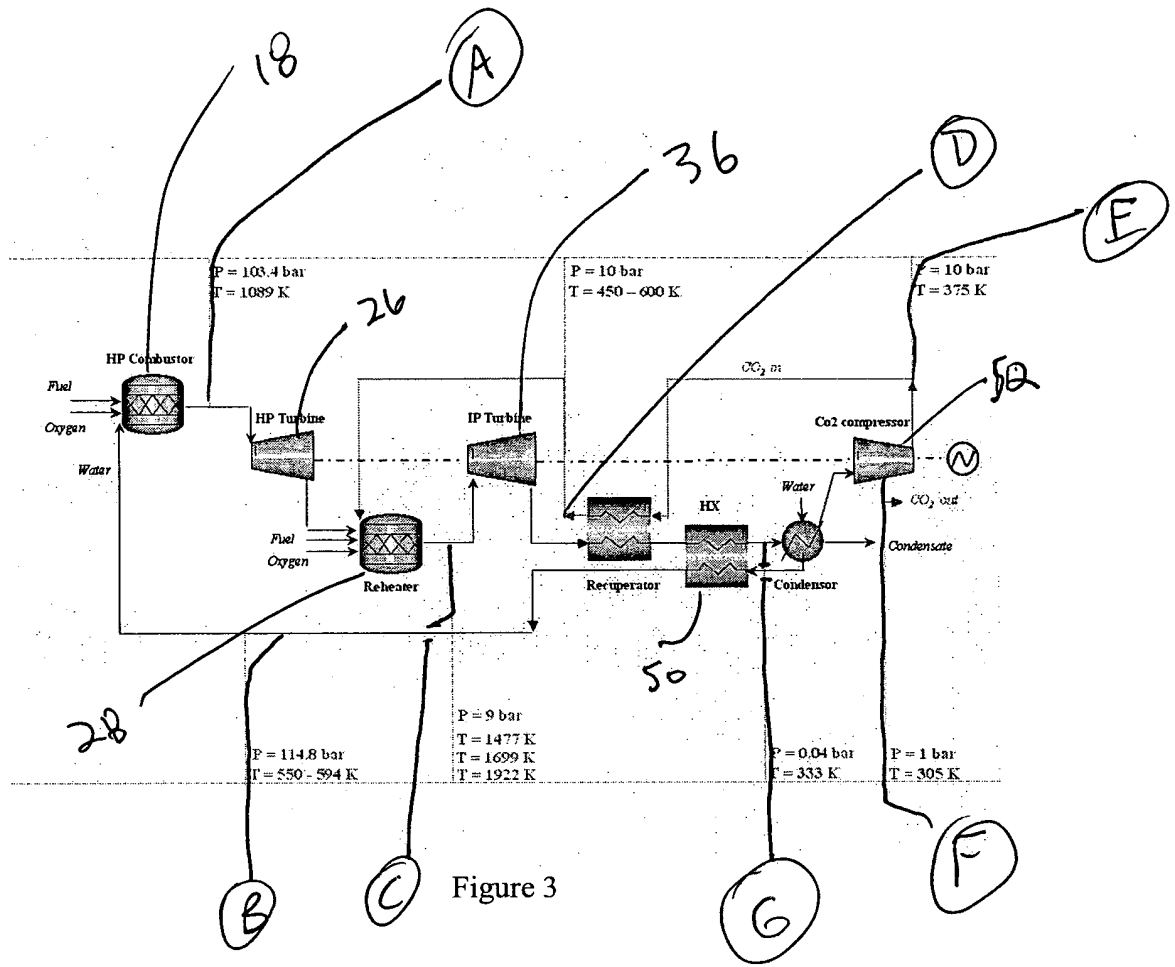


Figure 3

Fig 3

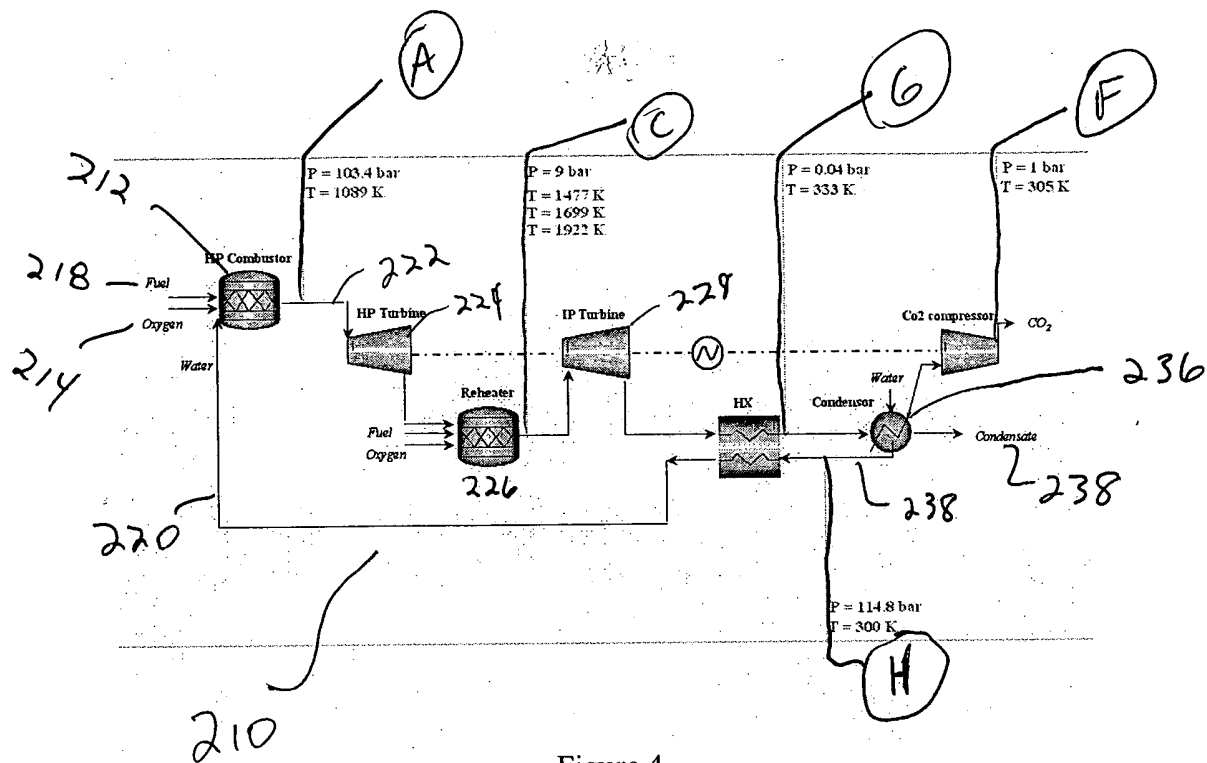


Figure 4

Fig 4



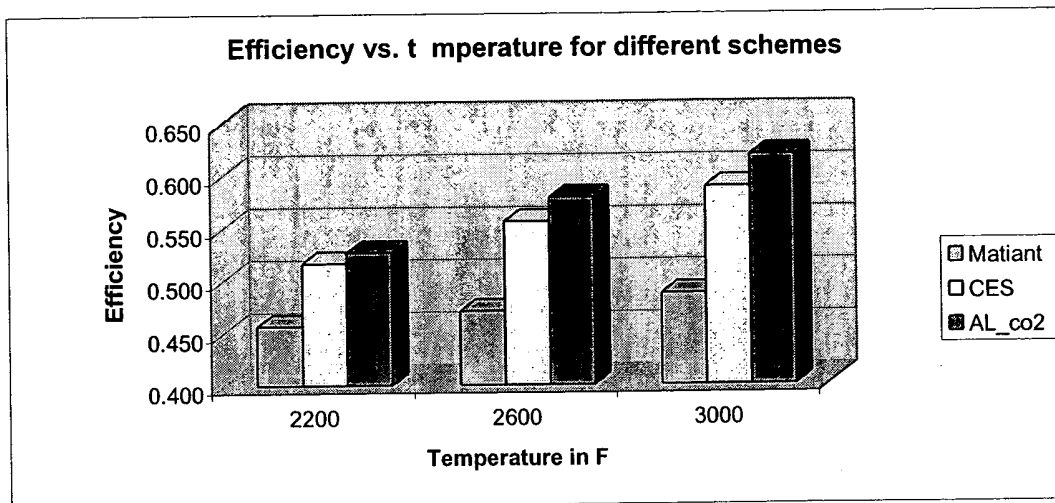


Figure 6

Fig 6

**TABLE 7 -- Water Recycle**

<b>Fuel</b>	CH4
Temperature Inlet	293 K
Pressure inlet	12.41 bar
<b>Oxidant</b>	O2
Temperature inlet	293 K
Pressure inlet	27.58 bar
<b>Fuel 2</b>	CH4
Temperature Inlet	293 K
Pressure inlet	10 bar
<b>Oxidant 2</b>	O2
Temperature inlet	293 K
Pressure inlet	10 bar
<b>o2 &amp; ch4 (HP) (IP) Mcompressors</b>	
number of stage	4
method	polytropic
discharge pressure	(114.8) (10) bar
isentropic efficiency	0.8
intercooling	90 F each stg expt last
Pressure drop	0 psi

<b>HP c mbustor</b>	
Pressure outlet	103.4 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
<b>Turb1=Steam turbine HP</b>	
method	isentropic
discharge pressure	10 bar
isentropic efficiency	0.9
Inlet temperature	1089 K
<b>Reheater IP</b>	
Pressure outlet	9 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
<b>Turb2=Gas turbine IP</b>	
method	isentropic
discharge pressure	0.04 bar
isentropic efficiency	0.93
Inlet temperature	2200 2600 3000 F

TABLE 8 -- CO<sub>2</sub> Recycle

Gas turbin side		St am turbine sid	
<b>Fuel</b>	CH4	<b>Steam turbin</b>	
Temperature Inlet	293 K	method	isentropic
Pressure inlet	10 bar	discharge pressure	0.04 Bar
		efficiency	0.9
<b>Oxidant</b>	O2	Inlet temperature	1089 K
Temperature inlet	293 K		
Pressure inlet	10 bar	<b>Condensor 2</b>	
		hot stream outlet	vap frac=0
<b>IP combustor</b>		Pressure drop	not taken into account
Pressure outlet	9 bar		
pressure drop	10%	<b>Separator 1</b>	
reaction	complete	temperature	305 K
Q loss	0 W adiabatic	pressure	1 bar
		Liquid entrainment	0
<b>Gas turbine</b>			
method	isentropic	<b>Water pump</b>	
discharge pressure	1 bar	discharge pressure	2 bar
efficiency	0.93	efficiency	0.75
Inlet temperature	2200 2600 3000 F		
		<b>Water</b>	
<b>HRSG</b>		Temperature inlet	293 K
hot stream outlet	140 F	Pressure inlet	1 bar
Pressure drop	not taken into account		
		<b>Circulation pump</b>	
<b>Condensor 1</b>		discharge pressure	100 bar
hot stream outlet	100 F	efficiency	0.75
Pressure drop	not taken into account		
<b>(Co2) Mcompressors</b>			
number of stage	4		
method	polytropic		
discharge pressure	10 bar		
efficiency	0.8		
intercooling	90 F each stg expt last		
Pressure drop	not taken into account		
<b>Water pump</b>			
discharge pressure	2 bar		
efficiency	0.75		
<b>Water</b>			
Temperature inlet	293 K		
Pressure inlet	1 bar		

TABLE 9 -- Preferred Embodiment

<b>Fuel</b>	CH4
Temperature Inlet	293 K
Pressure inlet	12.41 bar
<b>Oxidant</b>	O2
Temperature inlet	293 K
Pressure inlet	27.58 bar
<b>Fuel 2</b>	CH4
Temperature Inlet	293 K
Pressure inlet	10 bar
<b>Oxidant 2</b>	O2
Temperature inlet	293 K
Pressure inlet	10 bar
<b>o2 &amp; ch4 (HP) (IP)</b>	
<b>Mcompressors</b>	
number of stage	4
method	polytropic
discharge pressure	(114.8) (10) bar
isentropic efficiency	0.8
intercooling	90 F each stg expt last
Pressure drop	0 psi
<b>CO2 Mcompressor</b>	
number of stage	3
method	polytropic
discharge pressure	10 bar
isentropic efficiency	0.8
intercooling	90 F each stg expt last
Pressure drop	0 psi

<b>HP combustor</b>	
Pressure outlet	103.4 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
<b>Turb1=Steam turbine HP</b>	
method	isentropic
discharge pressure	10 bar
isentropic efficiency	0.9
Inlet temperature	1089 K
<b>Reheater IP</b>	
Pressure outlet	9 bar
pressure drop	10%
reaction	complete
Q loss	0=adiabatic
<b>Turb2=Gas turbine IP</b>	
method	isentropic
discharge pressure	0.04 bar
isentropic efficiency	0.93
Inlet temperature	2200 2600 3000 F

<b>Vaccum 'pump' (Mcompressor)</b>	
number of stage	4
method	polytropic
discharge pressure	1 bar
isentropic efficiency	0.8
intercooling	90 F each stage
Pressure drop	0 psi
<b>HeatX1 = Condensor</b>	
hot stream outlet	333 K
Pressure drop	not taken into account
<b>HeatX B1 = recuperator</b>	
hot stream outlet	605 K
Pressure drop	not taken into account
<b>Air cooler</b>	
hot stream outlet	295 K
Pressure	0.04 bar
Pressure drop	not taken into account
<b>co2 reheater</b>	
hot stream outlet	326.6 K
Pressure drop	not taken into account
<b>Water pump</b>	
discharge pressure	114.8 bar
efficiency	0.75
<b>Wout pump</b>	
discharge pressure	1 bar
efficiency	0.75
<b>Water</b>	
Temperature inlet	293 K
Pressure inlet	1 bar

**TABLE 10 -- Comparison**

Type of cycle	T HP	T IP	Final Pr ssur	M.F. CO2	M.F. CO2	Eff	Eff
	F	F	Bar	flue gas	recycled	Without seq	With seq
matiant	1500	2200	1 & 0.04	0.930	0.916	0.456	0.438
matiant	1500	2600	1 & 0.04	0.914	0.893	0.471	0.452
matiant	1500	3000	1 & 0.04	0.868	0.897	0.487	0.468
CES	1500	2200	0.04	0.222	0.000	0.516	0.498
CES	1500	2600	0.04	0.234	0.000	0.556	0.537
CES	1500	3000	0.04	0.246	0.000	0.588	0.570
CO2 case2	1500	2200	0.04	0.805	0.890	0.527	0.509
CO2 case2	1500	2600	0.04	0.800	0.876	0.579	0.560
CO2 case2	1500	3000	0.04	0.785	0.856	0.618	0.599